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WEST RALEIGH

IMPROVED METHODS FOR MAKING COTTAGE
AND NEUFCHATEL CHEESE

THE NORTH CAROLINA

AGRICULTURAL EXPERIMENT STATION

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IMPROVED METHODS FOR MAKING COTTAGE AND NEUFCHATEL CHEESE.

BY JOHN MICHELS.

PURE CULTURES OF LACTIC ACID BACTERIA.

In making Cottage and Neufchatel cheese, the first and most important essential is good flavor. Next in importance is uniformity of product. Both of these essentials can be obtained with certainty only by the use of pure cultures of lactic acid bacteria in souring the milk.

The cultures containing the lactic acid ferment are prepared commercially, and small samples, either in dry or liquid form, can be obtained from manufacturers at about seventy-five cents per bottle. The bottle thus obtained is emptied into a quart of pasteurized skimmilk, that is, skimmilk which has been kept at a temperature of about 170° F. for thirty minutes and then quickly cooled to about 70° F. As soon as the quart of skimmilk has thickened, which usually requires about twenty-four hours, it is ready for use.

In the process of heating, all of the active bacteria in the skimmilk are destroyed, thus leaving a clean field for the development of the lactic acid bacteria added to it from the bottle.

The method of using the lactic acid bacteria is similar to the use of yeast in breadmaking. The original germs obtained from the manufacturer may be propagated for weeks by daily transferring a small amount of the thickened skimmilk to newly pasteurized skimmilk. As a rule, one pound of the thickened skimmilk will sour thirty to forty pounds of sweet pasteurized skimmilk in twenty-four hours at a temperature of 70° F.

Parenthetically, it may be stated that pure culture of lactic acid bacteria (starters) are also frequently used in souring cream for butter-making. Indeed, the highest quality of butter is not possible without their use.

MAKING COTTAGE CHEESE.

Hitherto no definite method has been employed in the making of Cottage cheese, which, no doubt, is largely due to the fact that its manufacture has been almost entirely confined to the home. The method in common use, consists essentially in placing curdled milk, either heated or unheated, in a linen or cotton cloth bag which is hung up in some convenient place to allow the curd to drain.

Where cheese is to be made on a commercial scale, this method has not been found satisfactory. After much experimentation, we have succeeded in developing a method which has proven perfectly satisfactory in making cheese for city trade, and which it is felt can confidently be recommended for use by dairymen in general. The successive steps in this process are described in the paragraphs following.

Souring the Skimmilk.—Where from ten to twenty pounds of cheese are to be made at one time, the skimmilk is most satisfactorily soured in

four to eight gallon shotgun cans which have a uniform diameter of from eight to ten inches. Enough pure culture of lactic acid ferment is added to sour the skimmilk in about three hours at a temperature of 100° F. As a rule, one gallon of culture to every four gallons of sweet skimmilk will accomplish the souring in the given time.

The culture should be vigorously stirred and then thoroughly mixed with the skimmilk. As soon as this has been done the cans containing the mixture are placed in a tank of water, as shown in Fig. 1. In

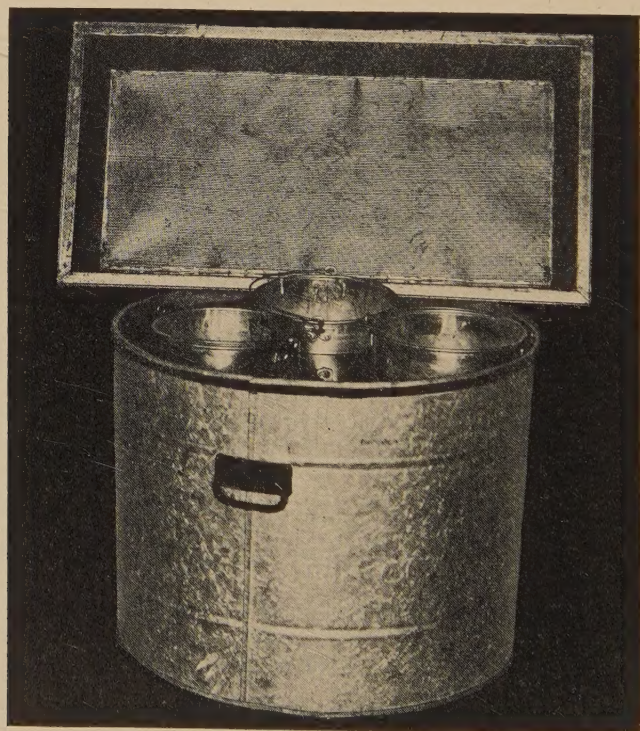


FIG. 1.—Strainer and Shotgun Cans in Water Tank.

heating the skimmilk to 100° F. the water in the tank should never exceed 110° F. The high temperature employed in souring the skimmilk has several advantages: (1) it hastens the souring process; (2) it causes the skimmilk to curdle with less acid, thus making a milder cheese; and (3) the curd may be stirred as soon as curdled without danger of diminishing the yield.

Where large quantities of cheese are to be made, the skimmilk should be soured in a common cream vat with an open end, which is usually used for adding ice to the water underneath. In the manufacture of Cottage cheese, this open end is necessary in order to observe the temperature of the water used in heating the milk and curd.

Cutting the Curd.—After the milk has thoroughly thickened, it should be broken up, with a knife preferably. Knives used for Cheddar cheese making are best. Where small quantities of cheese are made, a stirring rod like that described below will break up the curd satisfactorily.

Heating the Curd.—As soon as the skim milk has thoroughly curdled, the curd should be raised to a temperature of 104° F. by heating the water surrounding the curd to about 115° F., and care should be taken never to heat it above 120° F. During the heating the curd should be constantly stirred with a stirrer consisting of a four-inch heavy tin disc attached to an iron rod. Where a cream vat is used, the stirring is done by hand. When the curd has reached a temperature of 104° F. the water surrounding it should be removed and the stirring continued at intervals for forty minutes more, after which it is ready to drain.

In case the curd seems unusually soft, as is not infrequently the case, it will be an advantage to heat as high as 108° F. However, care must be taken when high temperatures are employed as they are apt to result in a tough curd.

Draining the Curd.—This is best accomplished in a tin strainer with perforated sides and bottom like that shown in Figs. 1 and 2. The strainer should be of ample size to hold conveniently all the curd, and to expedite drainage. A piece of cheese cloth should be spread over the strainer before receiving the curd. The latter must be hand-stirred as soon as it reaches the strainer, but the stirring should be done very carefully at the start to avoid loss by mashing the particles. Continue the operation until the curd is firm enough to prevent the particles from sticking together, which usually requires about five minutes. When proper firmness is reached, the curd is wrapped in the cloth strainer and squeezed with the hands until most of the whey has been removed. This operation requires only a few minutes, and care must be taken not to press the curd too hard. After pressing, the curd appears in a roll like that shown in Fig. 2.

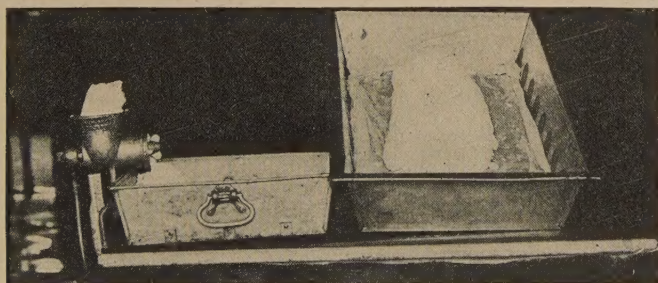


FIG. 2.—Curd in Strainer after pressing, and Curd Grinder.

Originally it was found necessary to grind the curd after pressing. This operation may be eliminated, however, by squeezing the curd until it can be readily granulated (without stickiness) with the hands. A little too much moisture is indicated by toughness and stickiness of the

curd. Further squeezing will rectify the trouble. On the other hand it is important not to get the curd too dry, though it is possible to overcome this by more soaking with milk or cream which will replace the extra moisture lost.

Salting.—When the curd has been squeezed dry enough, and is thoroughly granulated by rubbing and mixing with the hands, salt should be added at the rate of about one ounce per 6 to 8 pounds of cheese.

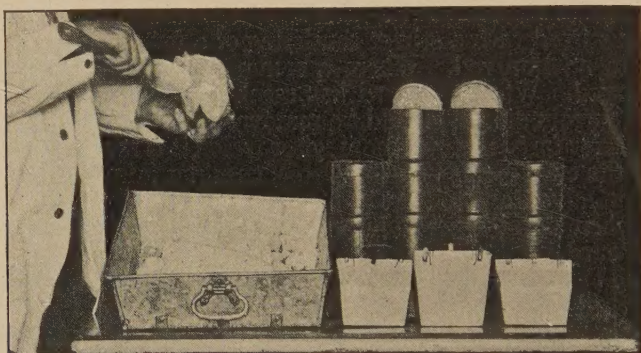


FIG. 3.—Cottage Cheese Packages and method of filling them.

Carefully mix the salt and curd and then proceed to soak the curd with milk or cream.

Soaking.—Now soak the curd with sweet, preferably pasteurized milk, until the curd assumes a moist condition. The amount of milk required for this purpose varies from one and one-half to two quarts for every ten gallons of skimmilk used. Two-thirds of this should be added immediately after salting, after which the curd is set aside for at least ten minutes when the soaking may be completed.

The amount of milk to be added to the curd varies somewhat from day to day, depending upon the amount of moisture left in it before salting. The rule to follow is to leave the curd fairly wet, but not so wet as to have the milk drip from it. If the cheese is to be kept a number of days, it is best to leave it rather dry by soaking less.

Packages and Packing.—Among a number of styles of packages tried, two have proven satisfactory: namely, the Gem Fibre butter package, made of pasteboard and lined with parchment paper; and a water-proof paper package commonly used for carrying ice cream. Both of these packages are illustrated in Fig. 3. The round packages are the Gem Fibre, which are easier to pack and better liked by consumers, though the cost is somewhat more than the water-proof paper sacks. It was found best to line both packages with parchment paper which has been either boiled in water or soaked in strong salt brine. Any surplus moisture should be allowed to drip from the paper before putting it into the packages. The latter should be washed in clear water before using, to insure freedom from dust.

Where cheese is to be kept a week or longer before it is consumed, tin capped glass tumblers have proven the most satisfactory packages,

though more expensive than the other packages mentioned. A paraffined or parchment cap should be put under the tin cover. Both tumbler and parchment cap should be sterilized in hot water before using.

The cheese is put into the packages by means of a large spoon, in the manner shown in Fig. 3.

Cream Cottage Cheese.—A high quality of cheese is secured by soaking the curd with cream instead of milk. Many customers will gladly pay the increase in the price necessitated by the addition of cream instead of milk. The cream cottage cheese is preferably packed in tumblers.

Yield of Cheese.—The average amount of skim milk required to make a pound of cheese soaked with milk is 7.1 pounds. Soaking with cream increases the yield.

MARKETING.

The writer has sold large quantities of this cheese to grocers at ten cents per pound, the latter retailing the same at fifteen cents per pound. The grocers were supplied with attractive signs calling attention to the fact that they had the cheese for sale.

Cottage cheese should be kept at reasonably low temperatures if desired to keep for some time. At refrigerator temperature it may be kept satisfactorily for several days when packed in pasteboard packages. If packed in tumblers as previously explained, it will keep several weeks at such temperatures.

The most satisfactory way of disposing of the Cottage cheese is to sell it direct to milk and cream customers along the route daily traveled by the dairyman. This saves the middleman's profits and insures the delivery of the product fresh.

SERVING COTTAGE CHEESE.

When the cheese is made according to the writer's method, it may be served without further treatment. Its palatability, however, may be improved by the addition of cream, especially when no cream was used in its manufacture. Additional salt and some pepper is also preferred by some. Others prefer adding sugar or syrup. Caraway and sage are sometimes used to flavor the cheese.

COTTAGE CHEESE AS A FOOD.

Cottage cheese when made as herein described, not only has a high food value, but has also tonic or medicinal qualities which are especially valuable during warm weather. Its nutritive value, where no cream is used is about the same as that of beefsteak. When soaked with cream it has a higher food value.

NEUFCHATEL METHOD.

Cottage cheese may also be made by the same method outlined in the following pages for Neufchatel cheese. The principal objection to this method is that the cheese is apt to get too dry, especially when made in small quantity. When made in large quantity, the method will prove satisfactory.

IMPROVED METHOD OF MARKETING AMERICAN NEUFCHATEL CHEESE.

During the past year, the Dairy Division of the Station has carried out extensive experiments in the manufacture of American Neufchatel cheese. The method hitherto employed in the manufacture of this cheese has not been entirely satisfactory. The process has been too long drawn out and too little attention has been given to the control of the lactic fermentation or souring process. In consequence of this the cheese has seriously lacked in uniformity, a very essential quality in any dairy product. Furthermore the packages in which the cheese has heretofore been sold have not been sufficiently tight to give the cheese a high degree of keeping quality. Very little of this cheese can be bought in the market during the summer owing to its poor keeping qualities.

In our experiments we have succeeded in overcoming almost entirely the objections above mentioned and the details of the process as worked out by us will be given now in detail.

MAKING NEUFCHATEL CHEESE.

Kind of Milk.—Whole milk reinforced with an amount of cream equal to about one-quarter that in the whole milk makes the best Neufchatel cheese. However, whole milk without the addition of cream will make a very satisfactory cheese. It is of first importance to use only milk which is clean and free from taints.

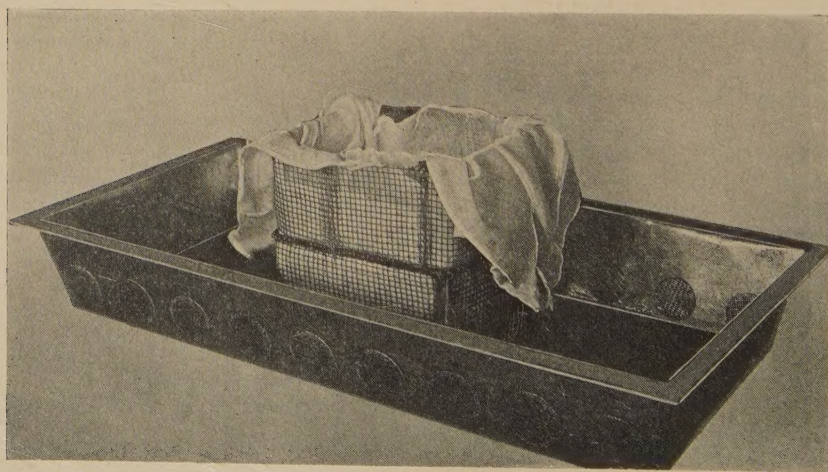


FIG. 4.—Method, and first stage, of draining curd.

Equipment.—When the cheese is made on a small scale, common cans of the shotgun style will answer for handling the milk. Where several hundred pounds of milk are used a small milk or cream vat may be used. A strainer with perforated sides and bottom is also needed to drain the curd.

Ripening the Milk.—As in the manufacture of Cottage cheese, the milk should be treated with a large amount of starter, or pure culture of lactic acid bacteria. On an average, one pound of starter to four pounds of milk will give best results. During warm weather when the milk has already ripened somewhat, and when there naturally is a more rapid development of actic acid, one part of starter to five of milk will be about right. On the other hand, during cold weather or when the milk is very sweet, it is best to use at the rate of one part starter to three parts of milk.

Adding Starter.—Thoroughly beat or shake the starter and strain it through one thickness of cheese cloth before adding it to the milk.

Setting the Milk.—As soon as the starter has been added, heat the milk to 80° F. and add at the rate of 2½ ounces of commercial rennet extract per 1000 pounds of milk. The rennet extract should be diluted with water to the extent of about eight times its own volume and then thoroughly mixed with the milk. The mixing should not be continued for more than three minutes. This precaution is necessary as the milk begins to thicken in about five minutes. Cover the milk and allow it to stand quietly for thirty to sixty minutes according to the amount of starter used. The more starter used the quicker the milk will curdle.

Cutting the Curd.—While the milk will usually be ready to cut in from thirty to sixty minutes, it is best to determine when this point is reached as for Cheddar cheese, by breaking the curd with the fore-

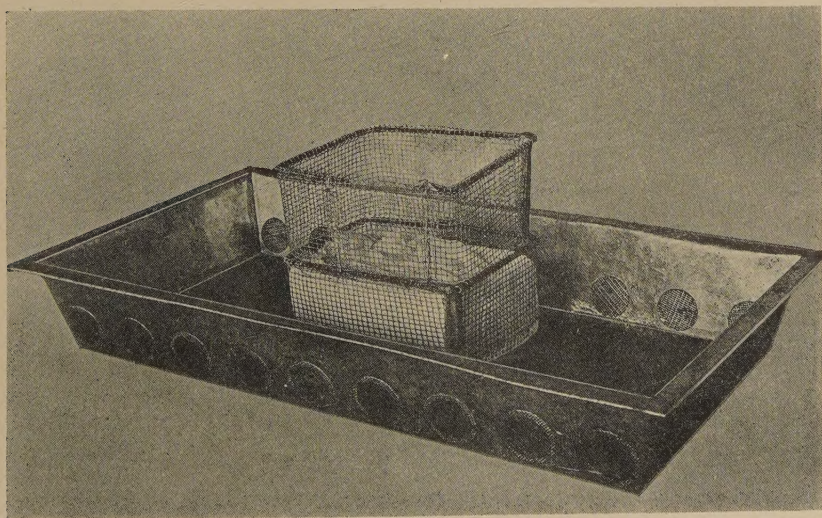


FIG. 5.—Curd after draining for an hour.

finger. If the whey in the break is clear, the curd is ready to cut; if milky, the curdling has not progressed far enough. In general the curd should be somewhat firmer than for Cheddar cheese before cutting.

Where much cheese is made, the curd is cut with special knives used with Cheddar cheese. The cutting in this case is done as follows: First cut the curd in horizontal layers with the horizontal knife; next cut lengthwise, and then crosswise with a perpendicular knife. This will make cubes about one-half inch on a side. Where small quantities of cheese are made any kind of a knife may be used to cut the curd. The smaller the amount of milk used, the coarser the curd should be cut.

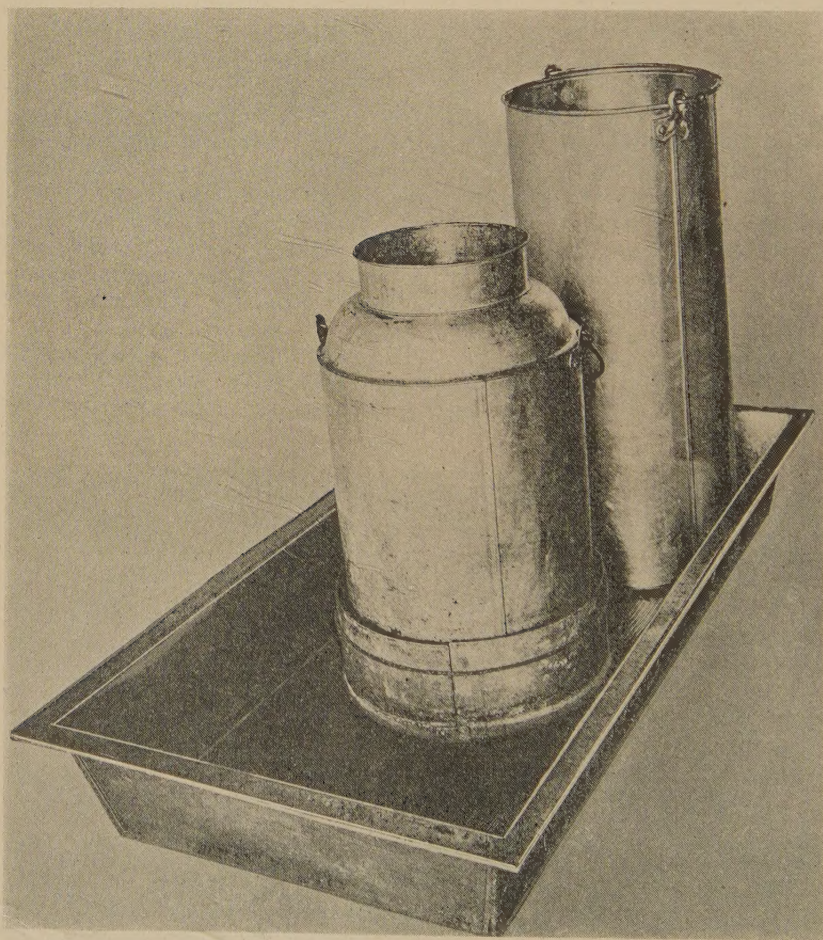


FIG. 6.—Pressure on the curd furnished by cans of water.

Draining the Curd.—As soon as the curd is cut it is carefully poured into a tin strainer lined with one thickness of cheese cloth. Both the sides and bottom of the strainer should be perforated. It should be about ten inches deep and of such width and length as to permit filling it the full depth. Allow the curd to drain undisturbed for about one

hour and then put a cover, preferably a metallic one, on it and add pressure at the rate of one pound for every gallon of milk used. During the next hour gradually increase this pressure until five pounds are used for every gallon of milk. Continue this amount of pressure for eight hours and then reduce to two pounds for every gallon of milk and keep at this pressure twelve hours longer when the curd is ready to salt.

Salting.—Salt at the rate of about one ounce of salt to six pounds of cheese. The salt can be evenly distributed during the mashing process.

Mashing the Curd.—With a heavy masher similar to a potato masher, thoroughly mash the curd to a smooth consistency, leaving no unbroken particles or lumps. The smoother the curd the richer it will appear and the better it will taste.

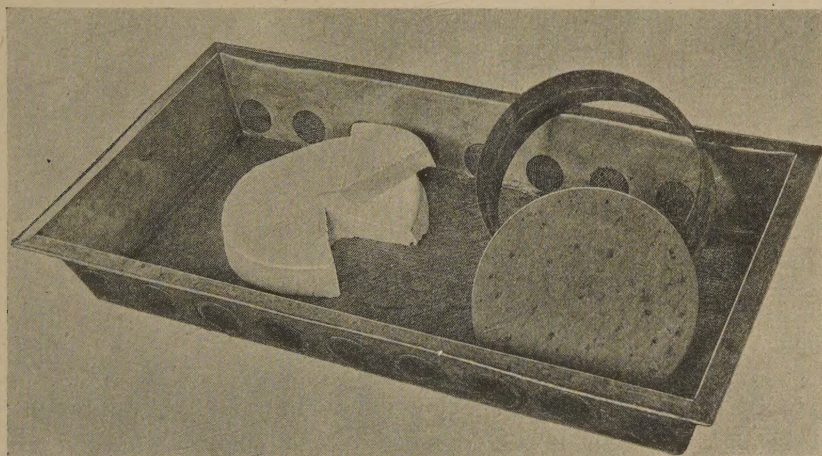


FIG. 7.—Consistency of curd after being pressed.

Packing.—A variety of packages may be used in which to pack the cheese. The common method of packing is to first wrap the cheese in parchment paper and then in tin foil. This method of packing is especially suitable where cheese is made on a small scale. Such a package is open to the objection, however, that it does not sufficiently exclude the air to prevent molding.

The best package is one in which the cheese can be kept as nearly air-tight as possible. We have found a tin capped tumbler the most satisfactory. The only objection to the tumbler is the expense when purchased in small quantities. In large quantities 8 ounce tumblers may be purchased very cheaply.

PACKING IN TUMBLERS.

A large spoon furnishes the best means for packing cheese in tumblers. The tumblers and the parchment caps which are put under the tin caps

should be sterilized in boiling water before using. Pack the tumbler brim full, then place a parchment paper cap on top and then cover with tin cap. The parchment cap should project about one-quarter inch over the edge of the tumbler. Cheese packed in this way will keep 10 days during warm weather without refrigeration.

GENERAL POINTERS.

In making Neufchatel cheese as herein described a good starter is indispensable. It will pay well to give the starter careful attention. Use attractive labels on the tumblers. They cost little, but will help sell the cheese at a better price. While the cheese can be kept some time without refrigeration, it is best to keep it in as cool a place as possible, such as a cellar.

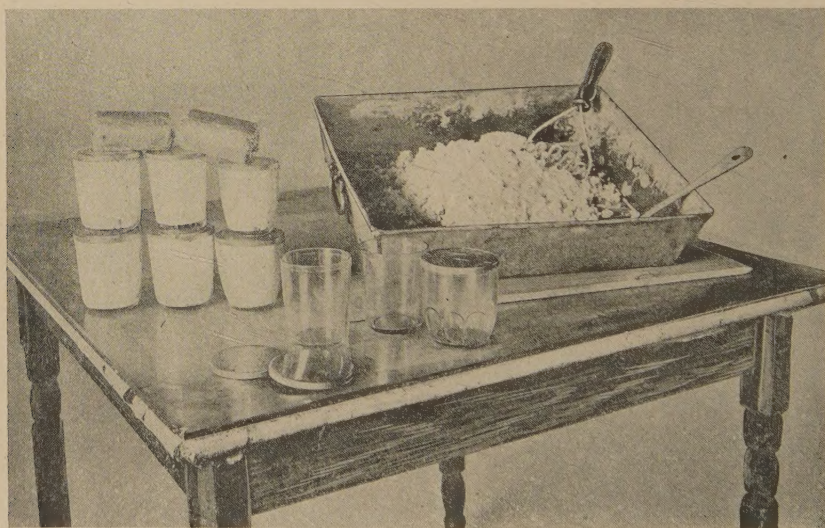


FIG. 8.—Curd ready to pack in two styles of packages.

SELLING PRICE.

Cheese packed in 8-ounce tumblers should readily sell at 10 cents per tumbler net. This price will yield good returns for milk and furnishes the consumer a wholesome and digestible food at a very reasonable price. In fact, cheese at the price mentioned, will be cheaper than meat at prevailing prices, especially when total digestible nutrients are considered.

YIELD.

Cheese made from 4 per cent. milk will yield thirty-four 8 ounce tumblers of cheese per hundred pounds of milk. When such milk is reinforced with an additional pound of butter-fat in the form of cream, the yield will be thirty-eight tumblers of cheese.